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Depression, anxiety and heart failure: A review

Short title: Depression and anxiety in heart failure

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Abstract

Background: Although common among patients with heart failure, depression and anxiety have been relatively neglected by researchers and practitioners. Both depression and anxiety have been implicated in contributing independently to the poor outcomes seen in patients with heart failure. Emphasis in the literature is on physical symptom recognition and management, in contrast to the patient's perspective of the effects of heart failure on his/her daily life.

Methods: This review summarizes and integrates research findings on anxiety and depression and translates these findings to clinical practice.

Results: Depression and anxiety are prevalent among patients with heart failure, and require assessment and intervention. Short-term nonpharmacologic approaches, in conjunction with drug therapy, hold promise in for successful management of patients who are depressed and or anxious.

Conclusions: Carefully designed clinical trials that are tailored to individual needs, yet are embedded within a systemic framework, are needed to inform clinicians regarding optimal practices for the treatment of patients with heart failure who suffer from depression and/or anxiety.

Key words: heart failure, depression, anxiety, cognitive behavioral therapy

“It is necessary not only to say something about what conditions people are experiencing but also to understand the impact these conditions have on their life.”¹

Approximately 250,000 individuals die as a consequence of heart failure (HF) each year, and the number of HF deaths has increased six fold during the past 40 years.² It is the leading cause for hospitalization in individuals 65 years and older, and the most costly cardiovascular disease in the U.S., with estimated costs exceeding 20 billion.²⁻⁴ Although HF has been described as “a new epidemic” with more than five million Americans identified and 500,000 newly diagnosed with HF annually, it has also been identified as a “last frontier” of behavioral cardiology.

Psychosocial issues, particularly depression and anxiety, in patients with HF have been relatively neglected by researchers and practitioners.⁵ Emphasis in the literature is on symptom recognition and management, in contrast to the patient’s perspective of the effects of heart failure on his/her daily life.^{6,7} The focus of this review was to summarize and integrate research findings on anxiety and depression, mood states that have been implicated in HF course and outcome, and to translate these findings to clinical practice. This review will also focus on a of lived experiences of patients struggling with the emotional and life-altering effects of previous weakness in the literature, failure to address anxiety and depression associated with HF from the perspective HF.^{7,8}

Depression and Heart Failure

Clinical depression is a disorder of mood, consisting of a combination of elements that interfere with a person’s ability to perform his/her day-to-day functioning.⁹ A diagnosis of major depression requires the presence of five or more of the following symptoms for a two-week period: (1) depressed mood; (2) markedly diminished interest or pleasure in all or nearly all activities; (3) significant weight loss or gain, or a decrease or increase in appetite; (4) insomnia or hypersomnia; (5) fatigue or loss of energy; (6) feelings of worthlessness or excessive or inappropriate guilt; (7) diminished ability to think or concentrate or indecisiveness; and /or (8)

recurrent thoughts of death, suicidal ideation, or suicide attempt. One of the symptoms must include depressed mood and/or loss of interest or pleasure, and the symptoms must reflect a change in functioning resulting in social, occupational, or other life impairment.⁹

Depression is the most prevalent psychiatric condition, a finding that is consistent across the world. Relapse and recurrence following successful treatment of depression are common. Segal and associates conclude that the risk for repeated episodes exceeds 80%, with patients experiencing an average of four major depressive episodes, each of 20 weeks in duration.¹⁰

Up to 5 billion of the total 20 billion costs associated with HF during 1998 may be associated with depression. Sullivan et al analyzed health care costs for three groups totaling 10,980 patients (no depression, antidepressant prescription only, and antidepressant prescription and depression diagnosis recorded), in a 3-year retrospective study of a health maintenance organization.³ Covariates were age, sex, medical comorbidity, and length of hospitalization stay. Hospitalization costs were 26% higher in the antidepressant prescription only group, and 29% higher in the antidepressant prescription and depression diagnosis recorded group, in comparison to the no depression group. Increased costs were attributed to increased inpatient and outpatient utilization and *not* increased mental health utilization. The authors concluded that depression and other conditions requiring the use of antidepressant medications contribute significantly to the direct medical costs for HF care.³

Depression is associated with increased mortality. Vaccarino et al, and Murberg et al reported that level of depression is linearly related to 6-month and 2-year mortality rates, respectively.^{11, 12} Moderately and severely depressed patients with HF are reported to have significantly higher mortality than mildly and nondepressed patients with HF. Patients with severe depression are four times more likely to die within two years compared to those classified as not depressed.

There is growing evidence that the prevalence of depression is high and may be increasing in individuals with HF. The prevalence of depression among patients with HF ranges

from 15% to 36%, although rates as high as 77.5% have been reported.^{11, 13-20} The rate of depression in individuals varies according to population studied, method of diagnosis, and the classification of depression.¹⁰ In addition, reported rates of depression vary based on the contexts in which they are assessed (i.e. hospital versus home). Nevertheless, rates are significant, and if undetected and untreated, account for substantial additional treatment costs associated with HF.³

Thomas et al.⁴ summarized the findings of eight recent studies of depression among patients with HF. Analysis of methodology revealed that different methods of assessing depression resulted in different prevalence rates. The lowest rates of depression among hospitalized patients were reported using the Depression Interview Schedule, an instrument designed to identify major depression. These rates were reported by Freedland and associates, and Jiang and associates as 20% and 13.9%.^{21, 22} Using the Beck Depression Inventory (BDI), more than twice as many individuals with HF were identified as depressed.²²

Hospitalization status affects reports of depression. A relatively consistent finding is that hospitalized patients with HF report higher rates of depression than stabilized outpatients. Among hospitalized patients with HF, depression rates ranged from 13.9%²² to 77.5%.¹² Among outpatients with HF, depression rates ranged from 13%²³ to 48%.²⁴

Given that patients with HF frequently cycle between periods of stabilization and periods of hospitalization, depressive symptoms may also change in the short term, depending on the patient's health and functional status during hospitalization and 4 to 6 weeks post discharge.⁴ Depression is also related to severity of HF symptoms. Baseline functional status, including limitation in activities of daily living and dyspnea at rest, are strongly related to depression.¹² Friedman and Griffin reported significant correlations between depression severity and increased physical symptoms or decreased physical functioning.¹⁷

Interpretation of results relating depression and HF are subject to selection bias, likely resulting in underestimates of the reported relationship between depression and HF.¹⁶ Not all invited patients choose to participate, and those who do participate tend to be healthier and less

prone to complain about functional limitations, in comparison those who do not choose to participate. It is also likely that those who do participate are less inclined to be depressed than those who decline to participate. In addition, studies do not typically include somatic depression symptoms of fatigue and insomnia. While they are symptoms of depressive state, they are also primary symptoms of HF and most studies do not analyze data both with and without these criteria, although there are exceptions.²⁵

Anxiety and Heart Failure

Anxiety is a negative affective state resulting from an individual's perception of threat and characterized by a perceived inability to predict, control or gain the preferred results in given situations.²⁶ Anxiety is a distinct emotional experience that has cognitive, neurobiological and behavioral components, and that arises out of the interaction of an individual with the environment.²⁷ It, like other emotions, allows flexibility in behavioral responses to a changing environment. Anxiety is considered an adaptive process until its magnitude or persistence render it a dysfunctional response that can have negative consequences.

Anxiety exists on a continuum from normal to pathological, and there are a number of anxiety disorders (i.e. panic disorder, phobic anxiety, generalized anxiety, anxiety reactions, chronic anxiety).^{26, 27} Nonetheless, research to date strongly suggests that anxiety along the continuum from normal anxiety reactions to pathological have comparable cognitive, neurobiological, and behavioral components, and that clinical anxiety and sub-clinical anxiety are not fundamentally different phenomena.²⁶⁻²⁹

Although there is considerably less research on anxiety than on depression in HF, existing evidence suggests that the prevalence of anxiety may be as high as 63% depending on the subgroup of HF patients studied.³⁰ As many as 40% of HF patients may suffer from major anxiety and overall anxiety levels are 60% higher than levels seen in healthy elders.^{31, 32} Compared to

other cardiac patients and patients with cancer or lung disease, patients with HF have similarly high or worse anxiety levels.^{30, 33} Although anxiety may be an expected and even normal reaction to the diagnosis of a serious chronic illness like HF, anxiety in patients with cardiac disease is not benign if it persists or is extreme.^{27, 34-42}

Only a few investigators have evaluated the association of anxiety with HF patient outcomes^{16, 43, 44} and the results of these investigations have been mixed. Anxiety predicted functional status at 1 year in patients with HF⁴⁴, but not rehospitalization or mortality.⁴⁵ However, in a study of patients with recent acute myocardial infarction (AMI) and depressed left ventricular function, anxiety was associated with a higher incidence of adverse cardiac events and cardiac death in the subsequent 6-10 years.⁴⁶ This inconsistency mirrors that seen in the study of the association between anxiety in patients with CHD and the risk of subsequent CHD events. Among these studies, four demonstrated that increased anxiety predicted subsequent CHD events (i.e. reinfarction, unstable angina, CHD mortality)^{32, 47-49}, three reported no association between anxiety and CHD outcomes^{38, 50-52}, and in one study anxiety was associated with a survival advantage.⁵³ Reasons for these inconsistencies may include the use of multiple different definitions and measures of anxiety.

Proposed Mechanisms Linking Depression and Anxiety with Poor Outcomes.

Reasons for the association between depression and anxiety, and adverse outcomes in patients with HF are not well understood. While some advocate that negative emotions may be a risk factor for HF, others suggest that HF may activate anxiety or depression or that perhaps there exists an interactional effect whereby negative emotions and HF impact one another in deleterious ways. To date there are few studies examining the mechanisms whereby depression or anxiety might be associated with morbidity and mortality outcomes in patients with heart failure, but the evidence in patients with heart disease likely is relevant to HF. There are two pathways proposed linking depression or anxiety and adverse outcomes in patients with heart disease: 1) behavioral; and 2) physiologic (see Figure 1).^{27, 29, 34, 35, 41, 47, 54-57}

Physiologic mechanisms: Sympathetic nervous system activation. Excess activation of the sympathetic nervous system (SNS) is strongly associated with increased morbidity and mortality in HF. Recent studies of the biology of negative emotions suggest that alterations in autonomic nervous system modulation, particularly the SNS, may partially explain the link with poor outcomes.⁵⁸⁻⁶⁰ Anxiety and depression, and the mental stress associated with them are associated with excessive activation of the SNS,^{59, 60} and catecholamine release,⁶¹ evidenced by decreased heart rate variability and increased plasma norepinephrine in both healthy persons and individuals with poor health.⁶²⁻⁶⁸ In addition, baroreflex control is impaired in anxious cardiac patients compared to those with no anxiety.⁶⁹

Sympathetic nervous system activation may result in poor cardiac outcomes through a number of pathways. It is associated with platelet aggregation, volume contraction, increased coagulation and recurrent thrombus formation.^{47, 70-75} Thus, SNS activation contributes to thrombogenesis.⁷⁶ Electric instability is another consequence of SNS activation and thus enhanced sympathetic stimulation is one cause of cardiac dysrhythmias for patients with cardiac disease.⁷⁷⁻⁷⁹ Acute psychological insults are capable of producing ventricular dysrhythmias in patients with cardiac disease.⁷⁹⁻⁸² Negative emotions are thought to be potent triggers of myocardial ischemia.^{83, 84} Mental stress can induce ischemia at lower levels of cardiac demand than exercise⁸⁵⁻⁸⁷ and even has caused complete coronary artery occlusion⁸⁸ and acute myocardial infarction.⁸⁹ Moreover, endothelial dysfunction (possibly as a result of increased sensitivity to catecholamines⁹⁰) in patients with CHD produces coronary artery vasoconstriction and decreased coronary flow velocity.^{68, 91, 92} Impaired ventricular function, evidenced by wall-motion abnormalities or decreases in ejection fraction is another consequence of negative emotions that may contribute to poor cardiac outcomes.^{40, 41, 91, 93-97}

Behavioral effect of depression: Nonadherence. Another possible explanation for the link between depression or anxiety and increased risk of death or rehospitalization is the effect of these emotions, particularly depression, on patient adherence. Nonadherence to HF treatment

plans is common.⁹⁸⁻¹⁰³ Poor adherence increases the risk of mortality and morbidity in patients with CHD and HF.¹⁰⁴⁻¹⁰⁷ In 42% to 64% of HF readmissions, lack of adherence to prescribed medication and/or diet plans has been implicated as the proximate cause of the readmission.^{98, 99, 102, 108}

Accumulating evidence indicates that depression may explain partially this high rate of nonadherence. Depression is associated with poor adherence to drug, diet and exercise recommendations in patients with CHD.^{109, 110} Chronically ill patients with depression are three times as likely to be nonadherent to their treatment regimes as those without depression.¹¹¹ Among patients with HF, mental health was a significant predictor of dietary and exercise adherence.¹⁰⁴

Pharmacological Interventions for Depression and Anxiety

Identification and management of depression and anxiety is “crucial” to the treatment of HF.¹¹² Jacob and Sebastian studied the pattern of antidepressants, anxiolytics, and other sedative-hypnotics prescribed during the course of non psychiatric hospital stays in patients with HF.¹¹² Only 7.9% were prescribed antidepressants, 20.5% received benzodiazepines and 8.2% received Benadryl. The authors concluded that antidepressants are not being prescribed adequately based on the rate of depression in this population of patients. They suggested the possibility that increased use of benzodiazepines and Benadryl is due to HF patients being treated for probable anxiety, irritability, and/or lack of sleep. The overlapping symptoms of fatigue, apathy, and anergia make it more difficult to adequately diagnose depression in patients with HF. The authors conclude that the underutilization of antidepressants may be due to under-recognition of symptomatology and/or under-treatment of depression. They recommend incorporation of questions to rule out depressive symptoms in routine evaluation protocols. Multi-center studies are needed to investigate how, and under what conditions, pharmacological treatments (i.e. SSRIs) can improve outcomes in patients with HF.

Cognitive-behavioral therapy and SSRIs have been demonstrated to be efficacious in primary care patients with mild depression.¹¹³ There are no controlled studies for patients with HF, with mild or severe depression. Since depression and anxiety may affect autonomic tone and produce decrease heart rate variability, some argue that SSRI use is “justified” given that SSRIs normalize heart rate variability.¹¹² Newer SSRIs have been shown to have minimal or no cardiac side effects, but the risk in patients with HF has not been systematically tested.¹¹⁴⁻¹¹⁷ It may be that a combination of treatment with SSRIs and therapy may demonstrate the best outcomes, but this prospect needs to be tested in controlled clinical trials.¹¹²

Nonpharmacologic Interventions

Heart failure often is a profound source of psychological distress for both patients and their support systems. Women coping with HF report bearing a greater proportion of burden than men, both in the role of patient and spouse.⁶ Given the prevalence and impact of depression and anxiety on patients diagnosed with HF, this section will address these emotional states associated with HF from the perspective of lived experiences of patients struggling with the emotional and life-altering effects of HF.

The nonpharmacologic intervention literature with respect to HF is sparse. There is need for evidence-based practices that have proven effective in addressing the life-altering effects of HF. Currently, interventions tend to draw from existing practices related to patients with associated cardiac difficulties such as acute myocardial infarction. In addition, interventions tend to implement “one-size fits all” practices, at the expense of sufficiently tailored interventions to meet the individual and unique needs of the patient. What is needed are diverse models of intervention that have embedded within them individually-tailored interventions that also utilize a systemic framework. In addition, coping style, issues related to meaning systems of the patient, social support, and religious and spiritual orientation of the patient are critical in designing interventions for patients with HF.

Coping Style. Coping style has been implicated as a predictor of disease course and outcome in HF patients. Murberg and Bru found that behavioral disengagement predicted mortality risk in 119 clinically stable patients with symptomatic heart failure within a two-year follow-up period, after controlling for severity of HF, functional status (NYHA), sex, and age.¹¹⁸ These results mirror those reported by Konstam et al.¹¹⁹ Disengagement occurs in the context of a disease course which includes physical incapacity, possible loss of roles, and fear and uncertainty about the future. Exploration of counseling tools that would increase the likelihood of HF patients becoming more actively engaged is critically needed.¹¹⁸ Specifically, development of counseling tools that increase the individual's motivation to effectively manage their heart failure are needed, particularly given the importance of the patient taking action (i.e. adherence to dietary and exercise regimens), and given the fatal nature of the disease.

Meaning. The idea that a sense of meaning and purpose is important to emotional well-being has been documented. Reker examined the unique, combined and interactive contribution of existential variables (personal meaning, choice/responsibleness, optimism) with respect to predicting depression in elderly individuals residing in community and institutional settings.¹²⁰ He found that personal meaning, optimism, social resources, and physical health predicted depression in institutionalized elderly. He concluded that existential paradigms in addition to stress paradigms can "... broaden our understanding and appreciation of the experience of depression in older adults" (p. 714).¹²⁰ Meaning-centered counseling provides a framework to assist individuals encountering "crisis in meaning".¹²¹ Further exploration of the need for a shift in paradigm, a shift that addresses both meaning systems and coping strategies is key.¹²² Helping patients develop and refine meaning systems that enable and empower them to deal more effectively with the disease process appear to be an important avenue for further inquiry for patients with HF.¹²³

Self-efficacy and perceived control. Research findings indicate that patients who believe in their ability to alter health-related behavior are more likely to engage in behaviors that are

associated with medical well being.¹²⁴ Tsay and Chao assert that individuals with high levels of perceived self-efficacy better manage their HF, which in turn leads to improvement in functional status, which in turn leads to improved emotional functioning (i.e. decrease in depression).¹³ Their results support the direct and indirect effects of perceived self-efficacy on depression, accounting for 46% of the variance. It is important to note that several limitations were evident in the Tsay and Chao study, including utilization of a Taiwanese population sample that not only was diagnosed with HF, but at least one additional chronic illness, thus limiting generalizability.¹³ However, their findings mirror those reported by other investigators supporting the relationship between self-efficacy and functional status.^{125, 126}

Perceived control includes the perception that one can effectively respond to unpleasant situations either behaviorally or cognitively with the goal of minimizing the aversiveness associated with the situation.¹²⁷⁻¹²⁹ It is thought that perceived control reduces helplessness, thus counteracting feelings of vulnerability and uncertainty, and reducing feelings of anxiety and depression.¹³⁰ Perceived control among cardiac patients, including those with heart failure, is associated with fewer depressive and anxiety symptoms,^{39, 123} higher self-esteem, and overall greater satisfaction with life.^{129, 131} Perceived control increases the likelihood that one will actively engage with the environment to improve the outcome of a distressing situation or event. It can be argued that perceived increase in control can lead to increased engagement with the environment, including increase in active coping skills and better compliance with drug, dietary, and exercise regimens.¹³² Bohachick and associates state that "...interventions that foster personal control may well hold the key to reducing poor psychological and functional outcomes" (p. 49).¹²⁹ Self-efficacy training for patients with HF to improve patients' confidence in their ability to engage in activities leading to improved functional status appears to be a fruitful endeavor. For example, currently there is lack of data suggesting when and how to assist patients with issues related to functional status. Questions remain relating to timing of nonpharmacologic and pharmacological interventions (i.e. at what juncture should pharmacological interventions be

entertained, in addition to cognitive behavioral interventions that address distorted thought patterns regarding functional status). Data-driven guidelines are needed to inform practitioners how to optimally proceed with HF patients who are clinically anxious and/or depressed.

Social support. An important resource in coping with HF is social support.^{118, 133} Social support provides a vehicle by which patients can experience a sense of well-being. In addition, social support can assist the individual in counteracting avoidance coping behaviors such as denial and behavioral disengagement, behaviors that are associated with poorer health outcomes for patients with HF.¹³⁴

Bohachick et al suggest that successful nonpharmacologic interventions need to focus not only on reinforcing personal control, but also on building and maintaining networks of helpfulness and attachments.¹²⁹ Patients should be encouraged to renew social relationships that have been neglected as well as build on new social relationships.¹²⁹ Support groups can provide a vehicle for the expression and validation of concerns, one possible modality that can influence reduction of feelings of anxiety and depression.

Family Dynamics. The quality of significant relationships in the patient's life is a relevant lens from which to understand how patients and their spouses cope with HF.⁶ In a study involving 128 male and 49 female HF patients and their spouses, Rohrbaugh et al. found that 57% of patients and 40% of their spouses reported being distressed, as assessed by the Hopkins Symptom Check List-25.⁶ The patient's distress was related to severity of illness. Results highlighted the contextual nature of HF distress, suggesting that role differences in distress vary by gender. Potentially important mediating variables such as level of spousal activity restriction¹³⁵ and the partners' styles of relationship-focused coping¹³⁶, and changes in their role responsibility dynamics, and adequacy of the couple's contact with the medical system¹³⁷ were not assessed. Results were biased toward couples who could endure an intensive regimen of home interviews. Family support, traditionally measured as spousal support, appears to be critical when considering HRQL in patients with HF.¹³⁸ Further studies are needed to expand our knowledge of family

dynamics to empower family members and significant others to decrease distress associated with HF.

Religiosity/spirituality/ Religiosity/spirituality has been acknowledged recently in the literature as an additional factor that may influence adaptation to illness.¹³⁹⁻¹⁴¹ Despite the fact that religiosity/spirituality is an integral component in the lives of most Americans (90% of Americans classify themselves as being “religious”), it is a neglected resource.¹³⁹ Only 1% of all articles on coping with stressful life events included a religious/spiritual component.¹³⁹

Although results are inconsistent, studies suggest that individuals who report higher levels of religiosity/spirituality respond to illness with better coping and/or improved adjustment and HRQL, in comparison to individuals who report lower levels of religiosity/spirituality.¹⁴² Research specifically related to coronary artery bypass surgery suggests that religiosity/spirituality not only is implicated in patients’ well being, but is also implicated in post-operative length of stay.¹⁴³ Research that moves the field beyond global religiosity/spirituality indicators to a more complex, thorough assessment of religiosity/spirituality and HRQL in patients with HF is needed.

To summarize, with respect to behavioral interventions, research conducted over the past twenty years supports the use of cognitive-behavioral approaches in the treatment of depression and anxiety.^{9, 144} Features of cognitive behavior therapy (CBT) that have been identified as key to positive outcome in depression, but appear to be applicable to anxiety as well, include: (1) providing rationale for treatment; (2) providing highly structured and clear plans for change, including the provision of a sense of control; (3) providing feedback and support so that individuals can receive support and attribute improvement to their own abilities and efforts; and (4) teaching skills that increase personal effectiveness and independence.⁹

CBT provides HF patients with opportunities to monitor thoughts related to their disease, some of which may be non-adaptive, and formulate alternative ways of viewing and acting with respect to managing their disease. For example, patients may hold limiting ideas regarding their

functional capacities which can be challenged. Behaviors that reflect more accurate assessment of functional capacities can be supported by the clinician.

Guck et al. provide treatment suggestions for depressed patients with HF.¹⁴⁴ They suggest CBT be implemented when depression is: (1) not severe or chronic; (2) psychotic features are absent; (3) previous response to CBT has been positive; (4) medical contraindications to medications exists; and (5) recovery has not been achieved with medication alone.¹⁴⁴

Antidepressants may be considered when depression is severe, chronic or recurrent, psychotic features are present, previous positive response to medication, family history of depression, and/or patient is unable to do the work required in psychotherapy. A combination of CBT and medication may be indicated when symptoms of depression are severe or chronic and do not respond to therapy or if other psychosocial problems are present.¹⁴⁴ It is important to note that the above guidelines are suggestions and are not based on well designed studies with clinically depressed HF patients. To date, guidelines based on clinical trials for anxious and/or depressed patients with HF have not been developed.

Conclusions and recommendations

Depression and anxiety are prevalent among HF patients, and in order to enhance adaptation and decrease patients' risk of subsequent HF exacerbations or other cardiac events, depression and anxiety clearly need to be routinely assessed. One of the most important areas for future research is elucidating the mechanisms, physiological and/or behavioral, by which anxiety and depression cause poorer outcomes. Research in this area is important to help clinicians determine the best ways to manage HF patients. For example, without understanding the basic underlying mechanisms related to anxiety, it is difficult to know whether treatment should concentrate on pharmacological strategies such as beta-blocker therapy to decrease sympathetic nervous system responses to anxiety, or focus more directly on anti-anxiety drug therapy.

There is a need to acknowledge relapse rates in the literature on depression and anxiety in HF, particularly given the episodic nature of depression and anxiety. The treatment focus is on a

quick fix without adequate acknowledgement of the chronic and/or episodic nature of both depression and anxiety and how they interface with HF. Although we are becoming increasingly sensitive to the role of depression and anxiety in patients with HF, there continues to be a need to focus research and clinical efforts in a direction that incorporates and is consistent with the complexities and realities of lived experiences of patients with HF.

Short-term approaches such as anxiety management training and CBT interventions developed specifically for depression and anxiety can assist patients to identify cognitive and bodily cues of the onset of anxiety and depression. HF patients can be taught to develop responses that can result in the reduction or elimination of symptoms. Teaching relaxation and cognitive coping skills such as cognitive restructuring of negative cognitions can be helpful and empowering to patients adapting to HF.⁹ Approaches need to be individually tailored to address the motivation levels of HF patients who are depressed and/or anxious. Carefully designed clinical trials, that are tailored to individual needs, yet are embedded within a systemic framework, are needed to inform clinicians regarding optimal practices for the treatment of HF patients who suffer from depression and/or anxiety.

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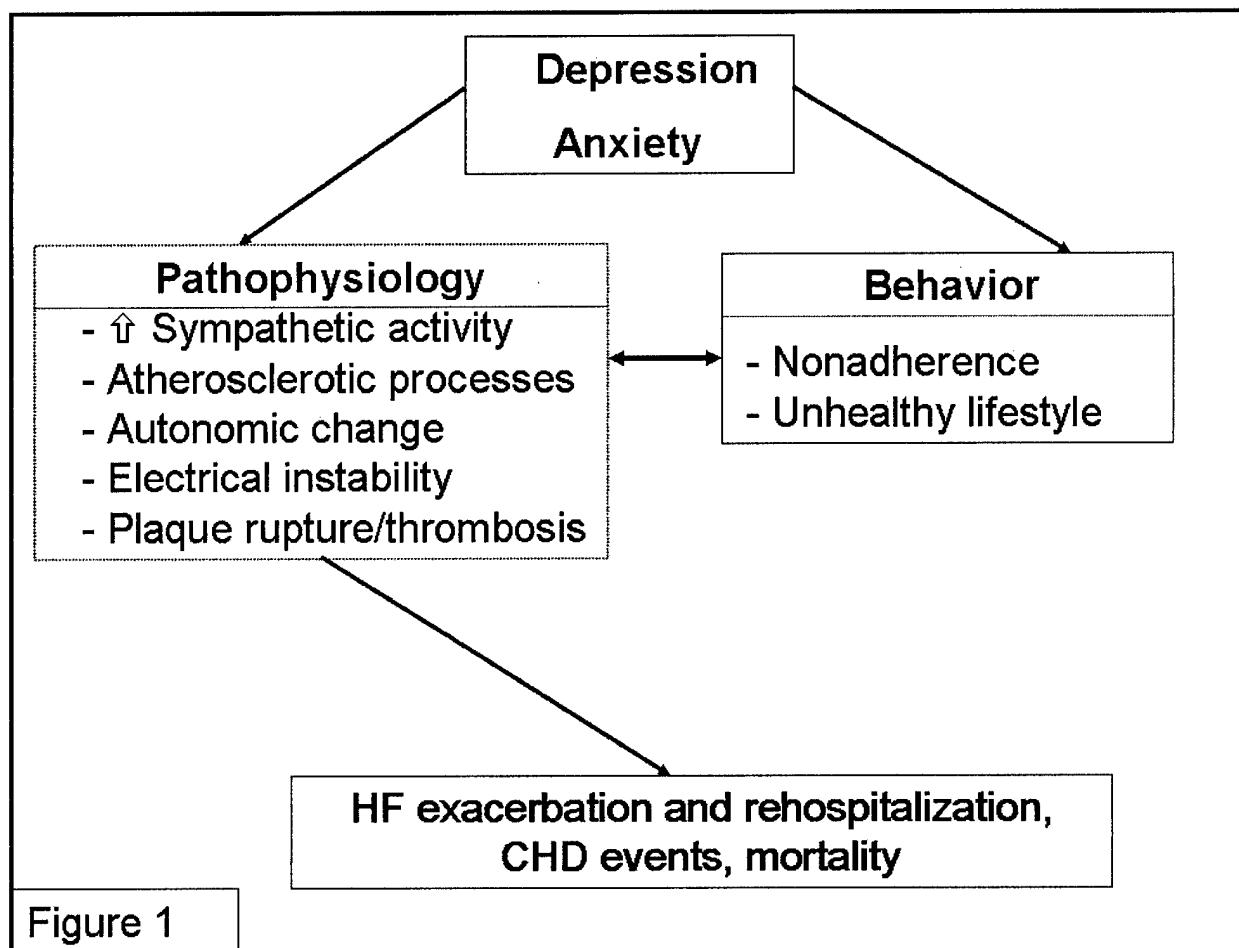
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Figure 1: Potential mechanisms linking depression and anxiety with adverse cardiac outcomes



Legend: CHD = coronary heart disease events